Tikrit University

College of Nursing

Basic Nursing Sciences

1st stage - 2023-2024

Biochemistry

(Lecture (10) Enzymes)

by:

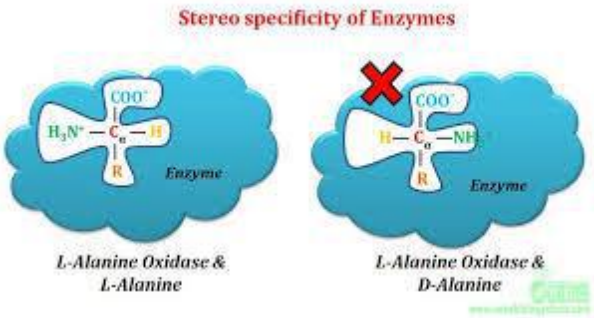
MSc. Reemy Marwan Mohammed saleh

Three types of specificity

1.Steriospecificity: enzyme show specificities with only one specific group of substrate.

Ex: Urease catalysis the hydrolysis of urea only

L- amino oxidase for L-alanine substrate.

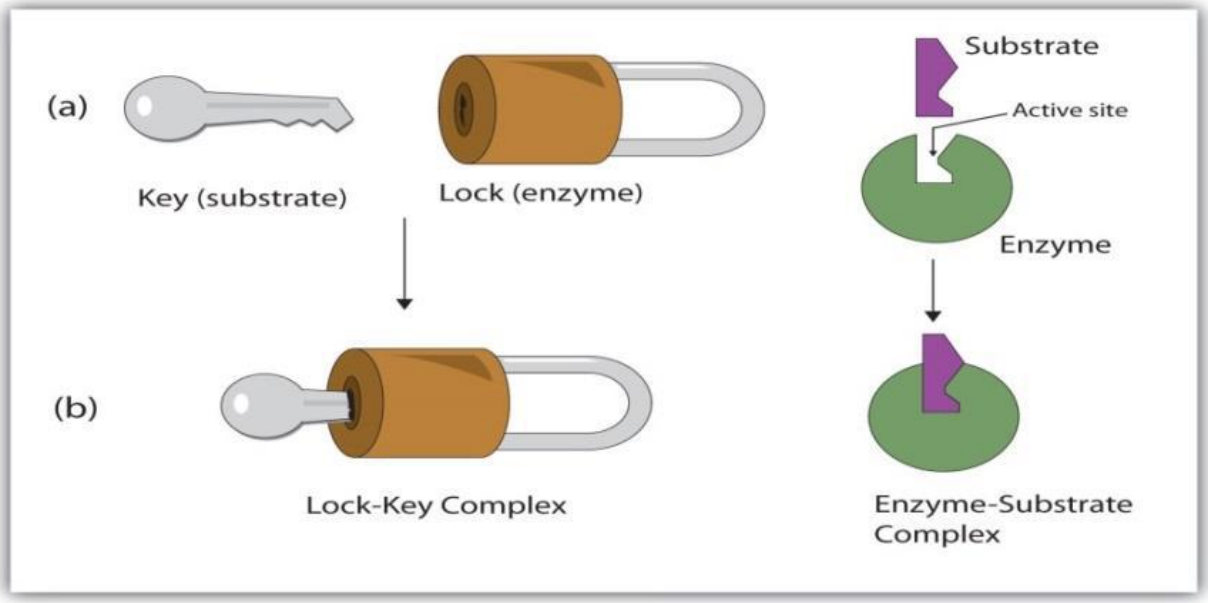


2. **substrate specificity:** enzyme catalyze reaction with specific substrate, cannot acts on other

substrate. They are Like lock and key model. Ex: Trypsin, Chymotrypsin

trypsin: hydrolyze peptide bonds involving carboxyl group of basic amino acids (arginine and lysine).

Chymotrypsin hydrolyze peptide bonds of aromatic amino acids (phenylalanine ,tyrosine).



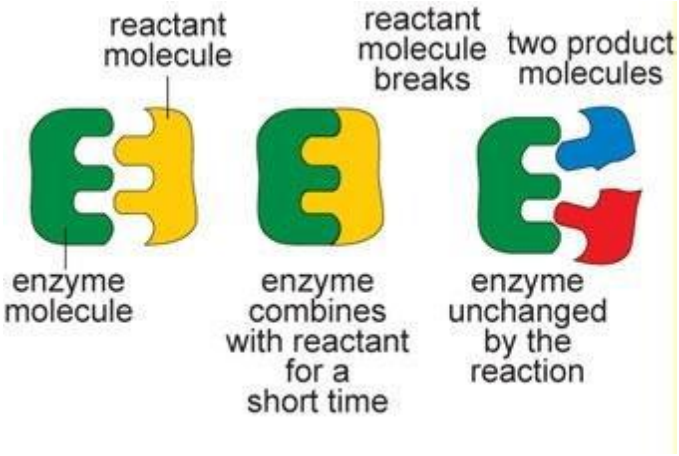
3-**reaction specificity** substrate can undergo many reactions but each reaction catalyzed by different

enzyme. Ex: Oxalic acid undergo different reactions.

Mechanism of enzyme action: according to Michaels and menton equation.

Enzyme + Substrate ⟹ Enzyme – substrate ⟹ Enzyme + product

Substrate: define as organic compound convert by enzyme to the product.



Factors affecting enzyme activity:

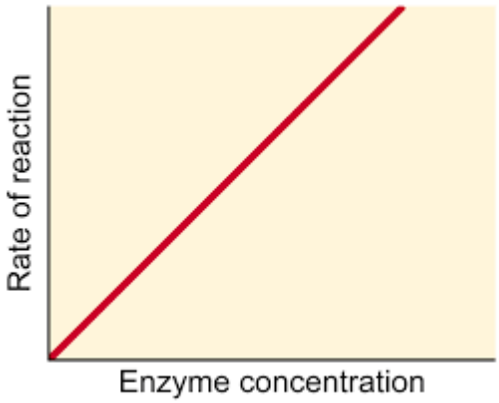
1-Enzyme concentration

A. The rate of reaction depends.

B. .at a specific time.

C. .unlimited substrate concentration.

.If the amount of enzyme is increased by two fold, the reaction rate is doubled

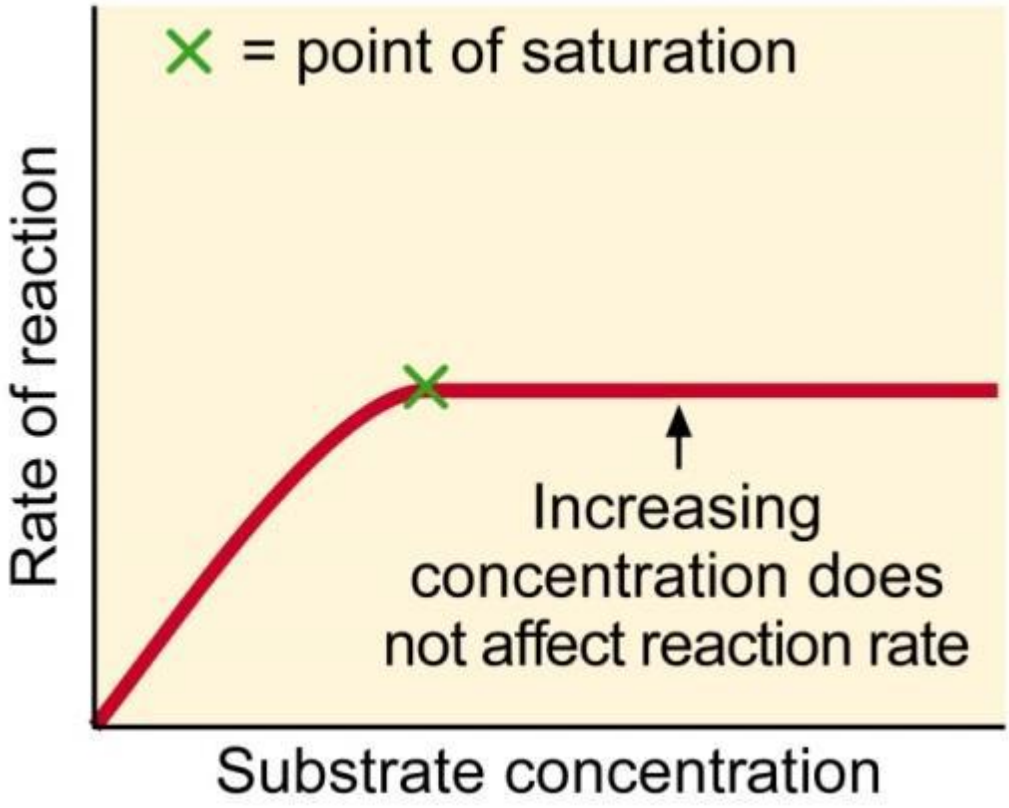


2.Substrate concentration .

a. The rate of reaction is directly proportional to the substrate avalible.

b. If the enzyme concentration is kept constant, and the amount of substrate is Increased.

c. Further increase in the substrate, does not increase the rate of the reaction any more.



3-Temperature.

A. . The rate of enzyme may increase with increase in temperature but up to a certain limit.

B. .All enzymes can work at their maximum rate at optimum temperature.

C. . for enzymes of human body 37°C is the optimum temperature .

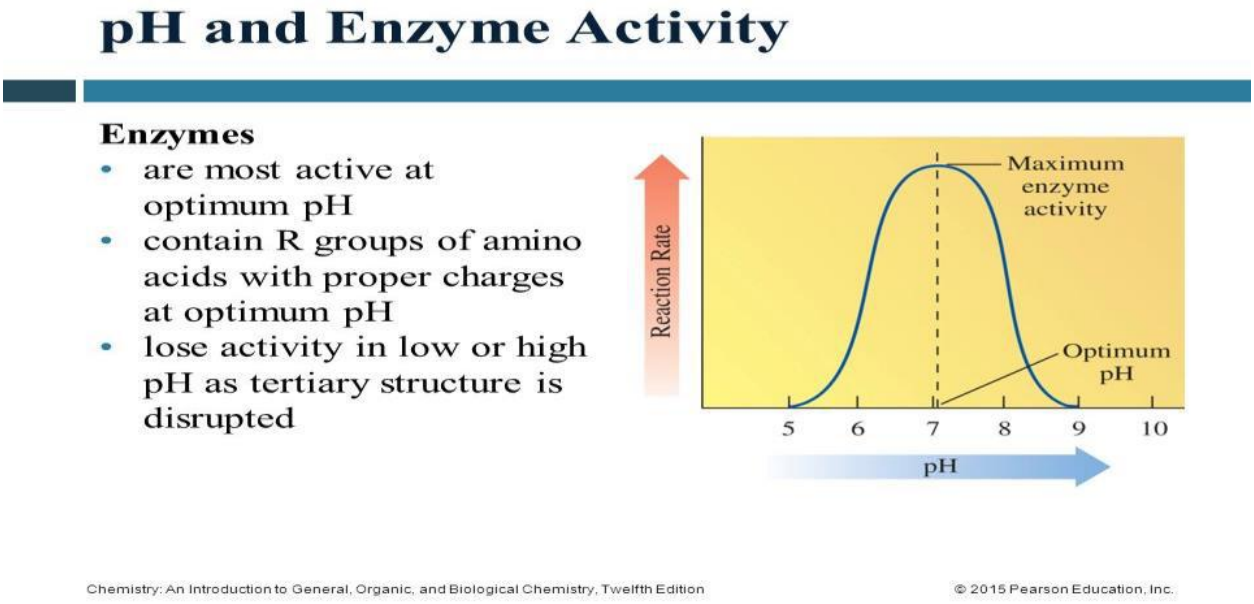
d. Enzymes denature at high temperatures.

4-Value of PH.

a. Enzymes have specific range of PH at which will work.

b. loose activity in low or high PH.

c. Enzyme denature (change shape and become ineffective). (in temperature and PH).



Enzyme inhibition

ransformed in place of substrate with the enzyme but is not ta chemical substance, can react : Inhibitorsinto product(s). the process called enzyme inhibition.

The Inhibitors : poisons, like cyanide, antibiotics, anti-metabolites and some drugs.

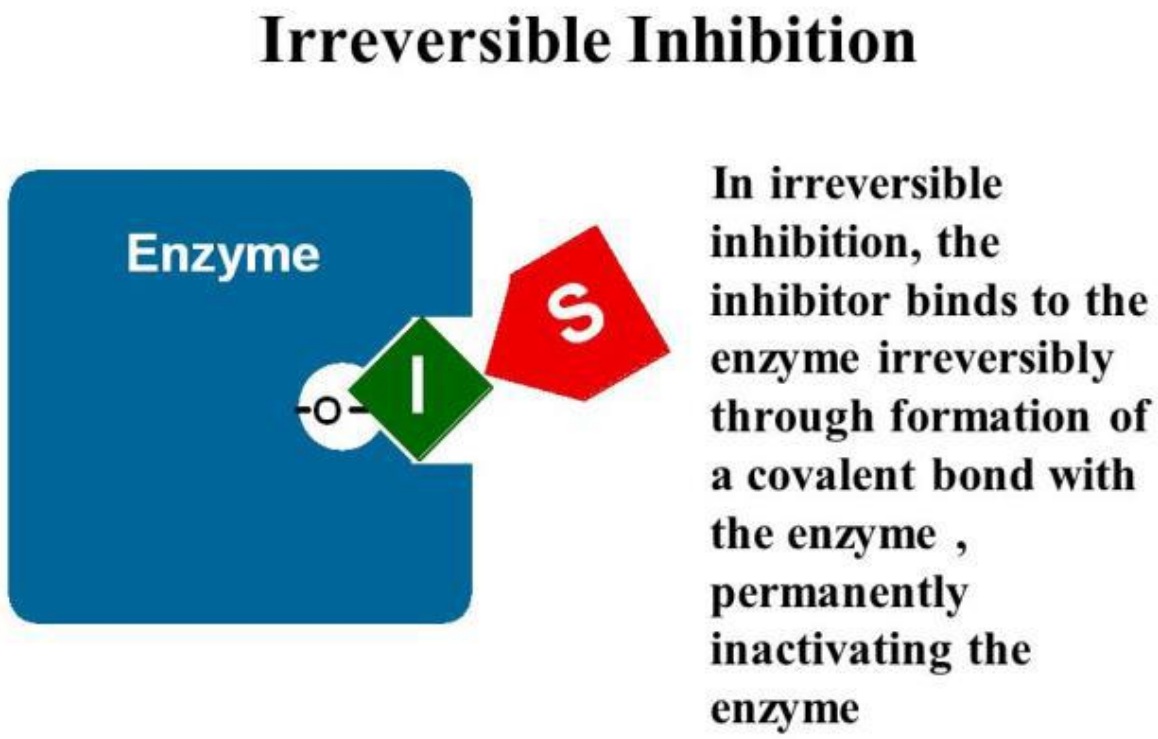
:Classification of inhibitors

Inhibitors can be divided into two types: (i) Irreversible (ii) Reversible

Irreversible inhibitors:

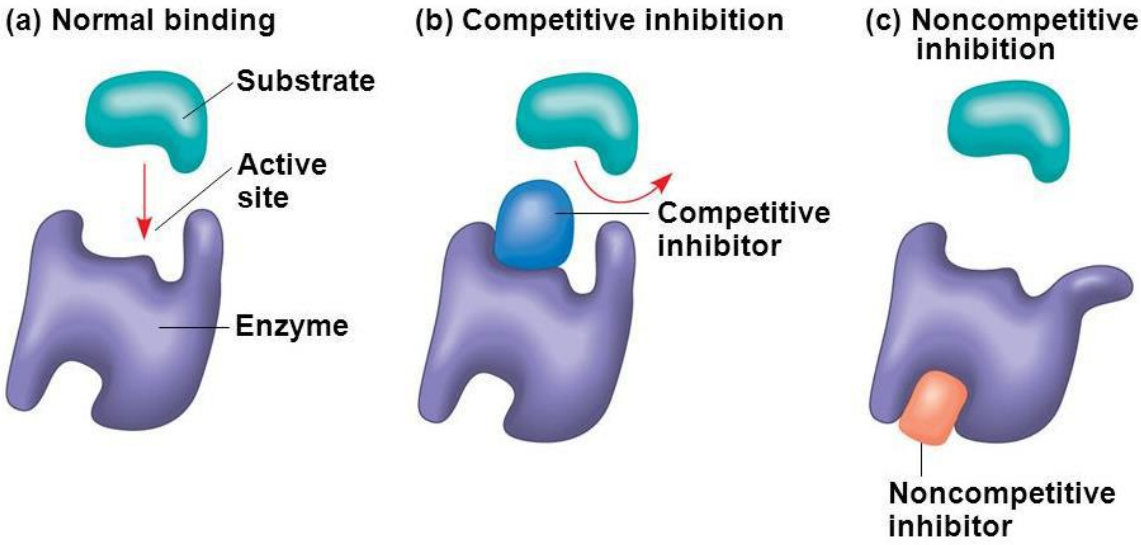
1. The inhibitor occupying the active sites by forming covalent bonds or they may physically block the active sites.

2. The inhibitor destroying the globular structure.



Reversible Inhibitors:

Reversible inhibitors attach to enzymes with non-covalent interactions such as hydrogen bonds, hydrophobic interactions and ionic bonds. Inhibitors form weak linkages with the enzyme.


(a) Normal binding
Substrate
Active site
Enzyme
(b) Competitive inhibition
Competitive inhibitor
(c) Noncompetitive inhibition
Noncompetitive inhibitor